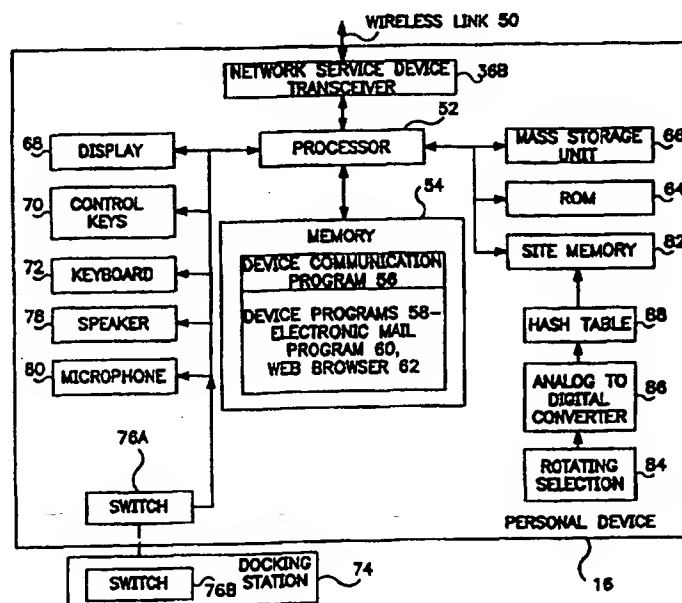




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(54) Title: NETWORK BASED INFORMATION/COMMUNICATION DEVICES AND SYSTEM



(57) Abstract

A network service device (16) connected to a computer network. The system includes a local area server having at least one link to other server and supporting the wireless network communication network (50) wherein the network-service device is tailored to provide specific network based services. Each network service device includes a processor (52), memory (54), display device (68), control keys (70), keyboard (72), microphone (80), speaker (78), modem or transceiver (36B), storage unit (66), A/D converter (86), hash table (88), ROM (64), site memory (82) and a switch (76A) to select the wire or wireless connection. The device program or browser provides the access to the network resources such as internet.

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NETWORK BASED INFORMATION/COMMUNICATION DEVICES AND SYSTEM

Technical Field

The present invention relates to a system and devices for providing network information access and communication services and, more particularly, for providing internet related services
5 such as web access and electronic mail services and the integration of services and functions through the internet.

Background Art

One of the most significant trends in industry and business in recent years has been the advent and increased availability and use of personal and portable devices for communications
10 and for access to information and the integration of services and functions through networks. This trend began with personal desktop computers and facsimile machines, which gave individual users personal and individual access to the data generation and manipulation powers of computers and the ability to send and receive data and images with the same ease as voice communications. The trend continued with cellular telephones and laptop and notebook
15 computers which, by being personal and readily portable and serviced by wide area radio networks, freed the users from geographic constraints, such as the desktop. At this time, for example, individuals may be found making use of notebook computers and cellular telephones in literally any location that an individual can go, from the office to the home or car and even on remote backpacking trails.

20 A parallel and more recent trend, however, has been the use of electronic mail and the internet, in particular the World Wide Web, for communication and as a readily available and wide ranging information source, so that the primary day to day business or professional environment of many individuals is the internet. That is, for many individuals electronic mail and the Web have replaced the telephone and the personal or notebook computer, and the
25 computer and the telephone system are primarily used as web and electronic mail devices rather than for their original functions. In addition, many services and functions that were formerly provided on a stand-alone basis by separate systems or through dedicated networks have been replaced by systems operating through the internet.

Individuals and systems using, for example, the information and communication
30 facilities of the internet, however, have not been able to take advantage of the portability and

lack of locational restriction offered by users of cellular telephones and laptop or notebook computers for a number of reasons, most particularly the need for a direct, physical connection to a telephone or cable line of some form. The user of electronic mail and the Web, for example, has thereby been tied to the desktop, or at least to locations within a few feet of a telephone jack.

- 5 Also, many potential users of electronic mail and, in particular, the Web, have been inhibited from taking advantage of these resources because of the complexity of the devices for making use of electronic mail and the Web. That is, in order to use electronic mail or the Web, it is necessary for a user to have and to learn to use a general purpose computer and then to learn to use a number of complex specialized electronic mail and Web browser programs, as well as the
- 10 necessary additional devices, such as modems.

The present invention provides a solution to these and other problems of the prior art.

Disclosure of Invention

- The present invention is directed to a network service device for use in association with a system for providing network based services and to a system for providing network based
- 15 services. The system includes a local area server having at least one network link to at least one network server and supporting a local area wireless network communicating with one or more network service devices wherein a network service device is tailored to provide specific network based services.

- According to the present invention, each network service device includes
- 20 a processor and a memory for executing network service device programs, a network services device transceiver for providing wireless local area communications between the network services device and the local area server, wherein the local area communications including transmission of representations of data from a network services device to the local area server and representations of other data from the local area server to the network services
- 25 device, and a memory for storing the network services device programs including a device communications program for controlling operation of the network services device transceiver and at least one network services device program for controlling the network services device for performing a network based service.

Also according to the present invention, a local area server includes

a processor and a memory for executing local area server programs, a local area server transceiver for providing the wireless between the local area server and a network services device, a modem connected to the network link for communications between the local area server and the at least one network server, and a memory for storing local area programs

5 including a transceiver control program for controlling the local area communications and at least one network communications program for controlling communications between the local area server and the at least one network server.

In one implementation of the present invention, the network services device is a personal device for use by a user to provide network based services to the user and includes a user output

10 device, which may be, for example, a liquid crystal display or an audio output device. The personal network services devices may also include a user input device, such as a keyboard or a set of dedicated control keys tailored specifically to the internet based services provided by the personal device or a user input/output device such as a touch screen liquid crystal display.

In further embodiments of the invention, the network services device transceiver is

15 programmable for transmitting and receiving the local area communications on a selectable one of a plurality of channels and may be self controlled for selecting a currently unused one of a plurality of channels for transmitting and receiving the local area communications.

In a presently preferred embodiment of the invention, the network services are provided by an internet connection and the network services device may include

20 an internet address memory for storing a pre-selected set of addresses of network servers, and a control input for selecting a one of the pre-selected set of addresses of network servers. In one embodiment, the control input for selecting a one of the pre-selected set of addresses of network servers includes a mechanically analog device for generating an analog voltage representing a pre-selected address of an internet server and an analog to digital code converter for converting

25 the analog voltage representing a pre-selected address of an internet server into an address of a pre-selected address of an internet server in the internet address memory.

In a still further embodiment of the invention, the network services device may include an encryption device for encrypting the local area communication between the network services device and a local area server with which the network services device is authorized to operate

30 and an encryption key memory for storing a key for encrypting the local area communication

wherein the encryption key corresponds to an encryption key stored in the local area server with which the network services device is authorized to operate.

As embodied as a system for providing personal internet based services, a presently preferred embodiment of the invention includes a local area server having at least one internet link connected to a link to at least one internet server and supporting a local area network and at least one personal device communicating with the local area server through the local area network. The local area server includes a processor and a memory for executing local area server programs, a local area server transceiver for providing wireless local area communications between the local area server and the at least one personal device, the local area communications including user inputs from the at least one personal device for directing internet communications functions and data received from the internet server to be provided to the at least one personal device, a modem connected to the internet link for user directed internet communications between the local area server and the at least one internet server, and a memory for storing local area programs including a transceiver control program for controlling the local area communications and at least one internet communications program for controlling communications between the local area server and the at least one internet server. The personal device, in turn, is tailored to provide the personal internet based services to a user of the personal device and includes a processor and a memory for executing personal device programs, a network services device transceiver for providing the wireless local area communications between the local area server and the at least one personal device, a memory for storing the personal device programs a device communications program for controlling operation of the local area device transceiver and at least one personal device program for controlling the personal device for performing the internet based service, an output device for providing the results of the internet based service to the user, and an input control device for user inputs for controlling operation of the personal device.

The present invention is also defined as a system for providing personal internet based services to a user within a restricted region defined by the coverage of a wireless local network. The system includes a local area server having an internet link to an internet server and including a local area server transceiver for providing wireless local area communications between the local area server and a personal device. The personal device is tailored to provide

the personal internet based functions to a user of the personal device and includes a personal device transceiver for providing wireless local area communications between the personal device and the local area server. The local area communications include user inputs from the personal device for directing internet communication functions of the local area server and data
5 received from the internet server to be provided to the personal device for use in providing the personal internet based functions to the user.

In its aspect of providing personal internet based services to a user within a restricted region defined by the coverage of a wireless local network, the system includes a local area server having an internet link to an internet server for performing internet communications
10 functions and providing wireless local area communications between the local area server and a personal device and a personal device tailored to provide the personal internet based functions to a user of the personal device. In this embodiment, the local area communications include user inputs from the personal device for directing internet communication functions of the local area server and data received from the internet server to be provided to the personal device for use in
15 providing the personal internet based functions to the user.

In a further aspect, the present invention is directed to a computer system capable of operating with the internet and including a local area server operatively connected to said internet for transmitting digital information to and receiving other digital information from the internet and a portable personal device capable of being hand-held by a user of the system. The
20 portable personal device includes a means for wirelessly connecting to the local area server in a manner to transmit a representation of the digital information to the local area server and to receive a representation of the other digital information from the local area server. The local area server includes a means for converting the representation of the digital information into the digital information and for converting the other digital information into the representation of the
25 other digital information, so that the user can communicate with the internet by using the hand-held, portable personal device within geographical limits imposed by transmission-constraints of the wirelessly connected means, while ambulatory, mobile or stationary.

The present invention may also be described as a computer system capable of operating with the internet and including a local area server connected to the internet for transmitting
30 digital information to and receiving other digital information from the internet and a personal

device that includes a means for wirelessly transmitting a representation of the digital information to the local area server and for wirelessly receiving a representation of the other digital information from the local area server.

Brief Description of Drawings

5 The foregoing and other objects, features and advantages of the present invention will be apparent from the following description of the invention and embodiments thereof, as illustrated in the accompanying figures, wherein:

Fig. 1 is a diagrammatic representation of a personal internet access system for providing internet related services to a user of a personal device operating in the system;

10 Fig. 2 is a block diagram of a local area server of the personal internet access system; and

Fig. 3 is a block diagram of a personal device of the personal internet access system.

Best Mode for Carrying Out the Invention

Referring to Fig. 1, therein is shown a diagrammatic representation of a Network Access System 10 which, as illustrated, includes a Local Area Server 12 connected from a Network 14 and one or more Network Servers 14A through 14n connected to the Network 14 and one or more Network Service Devices 16 communicating with the Local Area Server 12 through a Local Area Network 18. In a presently preferred embodiment, Network 14 is the Internet and each Network Service Device 16 is tailored for a specific function or related set of functions, such as electronic mail and World Wide Web access or games or system monitoring and control functions and to the use of a particular user or restricted group of users or for a particular purpose. Each Local Area Server 12 serves a plurality of Network Service Devices 16 within a restricted but sufficiently extensive geographic area or locality defined by Local Area Network 18, such as a home or office, although Local Area Network 18 may, in certain embodiments, be extended to cover a larger geographic area, such as an office building, town or other such delineated area, in a manner similar to cellular telephones.

As represented in Fig. 2, the Local Area Server 12 is connected to the Network 14 through an Network Link 20, such as a telephone line connection to the Web or to another internet server. The connection to Network Link 20 is typically by means of a Modem 22 and Local Area Server 12 could typically be comprised of a general purpose computer, such as a personal computer. Local Area Server 12 would include a Processor 24 and Memory 26 for

executing programs, and may include a Mass Storage Unit 28 for storing an operating system programs and applications programs, a Display 30, a User Input Device 32, such as a keyboard and mouse, and a Read Only Memory (ROM) 34 for storing boot programs, system configuration files, and so on. In other implementations, Local Area Server 12 may not include a
5 Mass Storage Unit 28, for example, when Local Area Server 12 operating system and applications programs, such as Java programs or scripts, are downloaded from an Internet Server 14, or may not include a User Input Device 32 or Display 30, depending upon the intended purpose and use of the Local Area Server 12.

For purposes of the present invention, Local Area Server 12 would further include a
10 Local Area Transceiver 36A and could include and execute an Operating System 38, Internet Communications Programs 40, such as an Electronic Mail Program 42, Web Proxy Program 44 and Modem Control Program 46, wherein Web Proxy Program 44 controls Local Area Server 12 to operate on Network 14 on behalf of a Network Service Device 16, and a Local Area Communications Program 48 controlling Local Area Transceiver 36A. In this regard, and for
15 purposes of the present invention, Local Area Transceiver 36A is similar to the wireless link transceivers found in "cordless" telephones, but enhanced for data communication at normal internet data rates and transmission quality rather than the standards required for voice communication. Local Area Communications Program 48, in turn, controls the communication of data and user inputs between a Local Area Server 12 and one or more Network Service
20 Devices 16 through Local Area Transceiver 36A and Wireless Links 50 which comprise Local Area Network 18. Local Area Communications Program 48 operates with, for example, a Web Proxy Program 44 to communicate data and user input between Network Service Devices 16 and the Internet Communications Programs 40.

Local Area Server 12 may operate and be used as a personal computer, and may in fact
25 be based upon a personal computer. As such, a Local Area Server 12 would thereby include the operating system and programs usual for such purposes, including applications programs, which would normally be stored in Mass Storage Unit 28. In alternate implementations, Local Area Server 12 could be implemented as a dedicated system specifically designed as a local area server for the system of the present invention and may be designed as a "utility" type device
30 similar to a "cable box" wherein the local user of the services does not have access to or

operational control of the device. In this embodiment, Local Area Server 12 may not include a Display 30, User Input Device 32 or Mass Storage Unit 28 and all of the programs may reside in a ROM 34. Also, and as described above, Local Area Server 12 operating system and applications programs may be downloaded from an Internet Server 14, for example, in the form of Java programs or scripts.

Therefore, and as described generally above, Local Area Server 12 will execute the functions and operations of the Operating System 36 and the Internet Communications Programs 40 in Memory 26 and Processor 24 to perform the usual electronic mail and web access functions through Modem 22 and Network Link 20 and Local Area Server 12 will function as a proxy on Network 14 for external devices such as Network Service Devices 16. For example, Local Area Server 18 may concurrently execute Local Area Communications Program 48 in Memory 26 and Processor 24, which will interoperate cooperatively with, for example, an Electronic Mail Program 42 and Web Proxy Program 44 to control Local Area Transceiver 36A to communicate with one or more Network Service Devices 16 through one or more Wireless Links 50 of Local Area Network 18.

As represented in Fig. 3, a Network Service Device 16 will include a Network Services Device Transceiver 36B similar to Local Area Transceiver 36A and a Processor 52 with Memory 54 for executing a Device Communications Program 56 for communicating with Local Area Server 12 through a Wireless Link 50 of Local Area Network 18 and one or more Device Programs 58 for controlling the desired functions of the Network Service Device 16. Device Communications Program 56 will execute in Processor 52 and Memory 54 to control the communication of data and user inputs between the Network Service Device 16 and a Local Area Server 18 through a Wireless Link 50, and will operate with Device Programs 58, which may include, for example, an Electronic Mail Program 60 or a Web Browser 62, to communicate data and user input between the Local Area Server 18 and the Device Programs 58. Device Communications Program 56 and Device Programs 58 may be stored in a Read Only Memory (ROM) 64 or, in certain instances, in a Mass Storage Unit 66. A Network Service Device 16 will also generally include a Display 68, and may include Control Keys 70 or a Keyboard 72, depending upon the particular purpose and functions of a given Network Service Device 16.

According to the present invention, a Network Service Device 16 may be a general purpose electronic mail and internet communication device, such as a notebook computer communicating with the internet through Local Area Server 18. In such embodiments, the majority of the functional components of a Network Service Device 16 may be provided by the components typically found in a personal computer, with the addition of a Network Services Device Transceiver 36B, a Device Communications Program 56 and one or more Device Programs 58.

In other embodiments, a Network Service Device 16 may be a dedicated, specific purpose device tailored for a particular function or use or limited range of functions or uses and, in such embodiments, the components of the Network Service Device 16 will generally be designed and constructed for the specific functions of the Network Service Device 16.

For example, a typical Network Service Device 16 could be constructed specifically as a portable web browser and electronic mail device. In this embodiment, the Personal Device 14 will include a Display 68, such as a super-twist color liquid crystal display (LCD), that may be constructed as a touch screen for the direct "point and click" control of a web browsing or electronic mail program in a manner compatible with current popular user programs. The device may also include a set of Control Keys 70 specifically selected for controlling the web browsing or electronic mail functions, and will probably include a Keyboard 72 for text entry to a web browsing or electronic mail program. The Keyboard 72 may be implemented in a number of ways, such as a fold-out or slide-out keyboard similar to those found in "pocket diaries" and calculators or as a graphic display on the touch screen display, although an on screen keyboard does reduce the display area of the screen. Alternately, or in addition, the device may be provided with a separate touch pad controller, for example, as part of Control Keys 70 or Keyboard 72.

Further in this regard, a Network Service Device 16 may be provided with a Docking Station 74 having power contacts for recharging the power supply batteries in the device. The Docking Station 84 could be implemented as part of Local Area Server 18 and the removal of the Network Service Device 16 from Docking Station 74 would, for example, activate a Switches 76A and 76B in the Network Service Device 16 and in the Docking Station 74 to turn on the Network Service Device 16 and initiate Local Area Server 18 to activate a Wireless Link

50 to the Network Service Device 16. Alternately, the Docking Station 74 could be physically separate from but connected to Local Area Server 18, or both physically and electrically separate from Local Area Server 18. In the latter instance, or if the Network Service Device 16 were recharged by a charger associated with the Network Service Device 16, for example, in the manner of a laptop computer, a Wireless Link 50 between the Network Service Device 16 and the Local Area Server 18 and communication between the units could be initiated by a signal transmitted from the Network Service Device 16 and detected by the Local Area Server 18. In this case, the Switch 76A in Network Service Device 16 could be implemented, for example, as an on-off switch, as internal "touch any key" logic operating from standby power, or as a motion or position sensing switch.

Other functions may be readily added to such a Personal Device 14. For example, the device may also include a Speaker 78 for sound, and perhaps a Microphone 80 so that the device could be used as a cordless telephone. Further in this respect, the addition of an appropriate Device Program 58, such as a basic word or text processing program or a notes type program together with an alphanumeric keyboard, would allow the Network Service Device 16 to be used as a "message board" by a number of users, such as the members of a family. The addition of a calendar program would allow the device to serve as a general calendar for the users, for example, to post doctor's appointments and so on.

In yet a further application, some homes and offices are now environmentally controlled by computer systems and, if an environmental control system were connected from Local Area Server 18 or provided with an internet connection, a Network Service Device 16 as described above could be used to control a local or remotely located home or office environmental system. Yet other Network Service Devices 16 may be constructed as home or office security or fire detection devices and connected through a Local Area Server 18 to provide security or fire indications to a Network Service Device 16 as described above, either directly or through the internet, or through the internet to a remote monitoring service. In such instances, the Network Service Devices 16 may not be provided with the user input and display devices used in Network Service Devices 16 intended for use by human users, unless required for setup and control of the devices, and may be connected directly to the sensors or systems that are to be monitored or controlled through Network 14.

Still further Network Service Devices 16 may be constructed for other specialized needs or interests. For example, a Network Service Device 16 with suitably ruggedized components including audio capability and a display screen could be built into a child's toy, such as a Teddy Bear. The device would preferably include an appropriate set of special purpose Control Keys 70 selected for the intended play functions, such as selection and playing of stories, music and games, which would be downloaded from a remote internet server or from the Local Area Server 12. A similar Network Service Device 16 with specialized control keys could also be provided for adult level games, such as chess and various card games, and both the adult and children's Network Service Devices 16 could be interactive through the internet with other users.

Yet another type of Network Service Device 16 would be specialized for "chat room" operation wherein the device would sit, for example, on a table in the manner of a radio but would monitor a selected "chat room" and would include a text to speech converter for audio playout of newly entered comments by other users. The device could include a microphone and speech to text converter to allow the local user to enter the user's own comments, or could incorporate a keyboard and dedicated purpose control keys to allow the local user to type in their comments.

It should be noted that many of the Network Service Devices 16 described above would be essentially intended for users who are not technically oriented or knowledgeable for various reasons, such as age or lack of interest in learning the technology necessary to use more general purpose systems, such as laptop computers. As described above, it is intended that Network Service Devices 16 for such users include displays, audio outputs and dedicated function control keys tailored to specific, dedicated functions in the manner of more common appliances, such as televisions, radios and CD players. For example, and as illustrated in Fig. 3, such a Network Service Device 16 may be provided with a Site Memory for storing the internet addresses of pre-selected internet sites, including other Local Area Servers 18. An up/down "channel select" Control Key 70 would then allow the user to step through the pre-selected sites to select the particular site desired at a given time. Alternately, a Rotating Selector 84, such as a potentiometer, with an Analog to Digital Converter 86 and possibly a Hashing Table 88 would perform the same function, but in an analog manner similar to the tuning dial on a radio, by converting a mechanically analog input into a digital address of a site address in Site Memory

82. It should be noted, in this regard, that the use of a Site Memory 82 loaded with pre-selected site addresses would be particularly advantageous in Network Service Devices 16 for use by children in limiting the children's choice of sites to those selected and approved by the responsible adults.

5 While it has been described above that each Network Service Device 16 may be primarily intended for use within the confines of a chosen Local Area Network 12, such as a particular home or office, certain users may wish to use their Network Service Device 16 outside the "home" Local Area Network 12. For example, a business person may wish to carry a Network Service Device 16 between home and their office and to use the Personal Device 14
10 within both locations or even to use their Network Service Device 16 between the locations. For example, a user may wish to use their Network Service Device 16 at home to retrieve information from their office, or may wish to use their Network Service Device 16 at the office to control functions within their home, such as turning on or off lights and heat, starting the stove for dinner, leaving a message on the message board Network Service Device 16 at home,
15 and so on. Also, while many Local Area Networks 12 will have restricted areas of coverage, such as within a single home, others may have much wider areas of coverage, in the manner of cellular telephone services. It is therefore possible that there may be interference and "leakage" between Local Area Networks 12, even between very restricted networks if they are closely located, such as in an apartment or condominium complex.

20 Therefore, given the possibility of use of Network Service Devices 16 between Local Area Networks 12 and the possibility for interference or "leakage" between Local Area Networks 12, it is desirable for Local Area Servers 18 and Network Service Devices 16 to include provisions for privacy and security, at least in selected instances.

 For example, mutual interference between Local Area Networks 12 may be largely
25 avoided by providing Local Area Transceiver 36A and Network Services Device Transceiver 36B with a plurality of selectable transmitting and receiving channels or frequencies, the frequency or channel of a given Local Area Server 12 and its associated Network Service Devices 16 being selected either at manufacture or during installation or programatically, that is, by automatic, program controlled self selection of frequencies or channels as is provided in
30 certain cordless telephones. In this regard, it may be desirable that at least certain of the Network

Service Devices 16, such as those intended primarily for use by professional users who may wish to operate their devices in a plurality of Local Area Networks 12, be provided with the capability of operating on any of a plurality channels or frequencies, with the current operating channel or frequency being selectable by the user.

5 Security and privacy from unauthorized intrusion, in turn, may be provided by means of passwords and codes. For example, each Network Service Device 16 may be provided with an individual security code, either at time of manufacture or when it is installed in a Local Area Network 12, with the security code installed, for example, in its ROM 64. The security code of a Network Service Device 16 may then be installed in the Local Area Server 18 of any Local Area
10 Network 12 in which it is authorized to operated, again, for example, in the ROM 34 of the Local Area Server 18, whereby a given Local Area Server 18 will recognize and respond only to those Network Service Devices 16 authorized to operate in its network. Security may be further enhanced by the use of user selectable and entered personal passwords, so that a Network Service Device 16 will respond to user input only when the user has entered the correct
15 password. In alternate implementations, or at least in certain Network Service Devices 16, physical interlocks, such as keys or magnetic keycards, may be used to prevent unauthorized use of the Network Service Devices 16.

Finally, privacy and security may be enhanced may the use of encryption wherein, for example, Local Area Servers 18 are provided with an encryption program or device with each
20 Local Area Server 18 so provided being assigned a corresponding individual encryption key. Each Network Service Device 16 authorized to operate in an encrypted Local Area Network 12 would also be provided with an encryption device or program, and a corresponding encryption key for that Local Area Server 18 would be installed in the Local Area Server 18 when it was authorized for the network. It should be noted that a lower level of privacy that would be
25 adequate for many applications may provided in a similar manner by the use of relatively simple encryption programs or devices and the assignment of encryption keys selected from a limited family or set of encryption keys to the Local Area Servers 18 and the Network Service Devices 16 in a manner similar to the assignment of transmitting/receiving channels or frequencies.

Finally, it is preferred that Local Area Servers 18 and Network Service Devices 16 be
30 constructed from commercially available components to the extent possible. For example,

components that may be used in Local Area Servers 18 could typically include an AMD Elan SC400 microcontroller for Processor 24, a PCMCIA modem for Modem 22, a PCMCIA Wireless LAN card for Local Area Transceiver 36A, a 2.5 inch disk drive for Mass Storage Unit 28 and 8 Megabytes of memory for Memory 26. In a similar manner, a Network Service Devices 16 could typically include a Digital StrongARM 1100 microcontroller for Processor 52, a PCMCIA Wireless LAN card from Netwave for Network Services Device Transceiver 36B, 4 Megabytes of flash memory for ROM 64, 8 Megabytes of memory for Memory 54, a 7.5 inch LCD panel and a touchscreen digitizer, both as available from Sharp. Other components that may be used for these purposes will be readily apparent to those of ordinary skill in the relevant arts, as will the additional minor components comprising these devices, such as batteries and so on.

In conclusion, while the invention has been particularly shown and described with reference to preferred embodiments of the apparatus and methods thereof, it will be also understood by those of ordinary skill in the art that various changes, variations and modifications in form, details and implementation may be made therein without departing from the spirit and scope of the invention as defined by the appended claims. Therefore, it is the object of the appended claims to cover all such variation and modifications of the invention as come within the true spirit and scope of the invention.

Claims:

1. A network service device for use in association with a system for providing network based services, the system including a local area server having at least one network link to at least one network server and supporting a local area wireless network and the network service device
5 being tailored to provide specific network based services and comprising:
 - a processor and a memory for executing network service device programs,
 - a network services device transceiver for providing wireless local area communications
between the network services device and the local area server, the local area
communications including transmission of representations of data from a network
10 services device to the local area server and representations of other data from the
local area server to the network services device,
 - a memory for storing the network services device programs including a device
communications program for controlling operation of the network services device
transceiver and at least one network services device program for controlling the
15 network services device for performing a network based service.
2. The network services device for providing network based services of claim 1 wherein the local area server comprises:
 - a processor and a memory for executing local area server programs,
 - a local area server transceiver for providing the wireless local area communications
20 between the local area server and a network services device,
 - a modem connected to the network link for communications between the local area
server and the at least one network server, and
 - a memory for storing local area programs including a transceiver control program for
controlling the local area communications and at least one network
25 communications program for controlling communications between the local area
server and the at least one network server.
3. The network services device for providing network based services of claim 1 wherein:
 - the network services device is a personal device for use by a user to provide network
based services to the user, and includes
30 a user output device.

4. The network services device of claim 3 for providing personal network services to a user wherein the user output device comprises a liquid crystal display.
5. The network services device of claim 3 for providing personal network services to a user wherein the user output device comprises an audio output device.
- 5 6. The network services device for providing network based services of claim 1 wherein:
the network services device is a personal device for use by a user to provide network
based services to the user, and includes
a user input device.
7. The network services device of claim 6 for providing personal network services to a user
10 wherein the user input device comprises a keyboard.
8. The network services device of claim 6 for providing personal network services to a user wherein the user input device comprises a set of dedicated control keys tailored specifically to the internet based services provided by the personal device.
9. The network services device for providing network based services of claim 1 wherein:
15 the network services device is a personal device for use by a user to provide network based services to the user, and includes a user input/output device comprising:
a touch screen liquid crystal display.
10. The network services device for providing network based services of claim 1 wherein:
the network services device transceiver is programmable for transmitting and receiving
20 the local area communications on a selectable one of a plurality of channels.
11. The network services device for providing network based services of claim 1 wherein:
the network services devices transceiver is self controlled for selecting a currently
unused one of a plurality of channels for transmitting and receiving the local area
communications.
- 25 12. The network services device for providing network based services of claim 1, wherein the network services are provided by an internet connection.
13. The further network services device for providing network based services of claim 12,
further comprising:
an internet address memory for storing a pre-selected set of addresses of network servers,
30 and

a control input for selecting a one of the pre-selected set of addresses of network servers.

14. The network services device of claim 3 for providing personal network services to a user, wherein the network services are provided by an internet connection.

15. The network services device of claim 14 for providing personal network services to a user,

5 further comprising:

an internet address memory for storing a pre-selected set of addresses of network servers,
and

a control input for selecting a one of the pre-selected set of addresses of network servers.

16. The network services device of claim 14 for providing personal network services to a user,

10 wherein the control input for selecting a one of the pre-selected set of addresses of network servers comprises:

a mechanically analog device for generating an analog voltage representing a pre-selected address of an internet server, and

15 an analog to digital code converter for converting the analog voltage representing a pre-selected address of an internet server into an address of a pre-selected address of an internet server in the internet address memory.

17. The network services device for providing network based services of claim 1, wherein the network services device transceiver further comprises:

20 an encryption device for encrypting the local area communication between the network services device and a local area server with which the network services device is authorized to operate, and

an encryption key memory for storing a key for encrypting the local area communication wherein the encryption key corresponds to an encryption key stored in the local area server with which the network services device is authorized to operate.

25 18. A system for providing personal internet based services, comprising:

a local area server having at least one internet link connected to a link to at least one

internet server and supporting a local area network, and

at least one personal device communicating with the local area server through the local area network,

30 the local area server including

a processor and a memory for executing local area server programs,
a local area server transceiver for providing wireless local area communications
between the local area server and the at least one personal device, the
local area communications including user inputs from the at least one
personal device for directing internet communications functions and data
received from the internet server to be provided to the at least one
personal device,
a modem connected to the internet link for user directed internet communications
between the local area server and the at least one internet server, and
a memory for storing local area programs including a transceiver control program
for controlling the local area communications and at least one internet
communications program for controlling communications between the
local area server and the at least one internet server, and
the at least one personal device being tailored to provide the personal internet based
services to a user of the personal device and including
a processor and a memory for executing personal device programs,
a network services device transceiver for providing the wireless local area
communications between the local area server and the at least one
personal device,
a memory for storing the personal device programs a device communications
program for controlling operation of the local area device transceiver and
at least one personal device program for controlling the personal device
for performing the internet based service,
an output device for providing the results of the internet based service to the user,
and
an input control device for user inputs for controlling operation of the personal
device.

19. A system for providing personal internet based services to a user within a restricted region
defined by the coverage of a wireless local network, comprising:

a local area server having an internet link to an internet server and including a local area server transceiver for providing wireless local area communications between the local area server and a personal device, and

5 a personal device tailored to provide the personal internet based functions to a user of the personal device and including a personal device transceiver for providing wireless local area communications between the personal device and the local area server, wherein

the local area communications includes user inputs from the personal device for directing internet communication functions of the local area server and data received from the internet server to be provided to the personal device for use in providing the personal internet based
10 functions to the user.

20. A system for providing personal internet based functions to a user within a restricted region defined by the coverage of a wireless local network, comprising:

a local area server having an internet link to an internet server for performing internet communications functions and providing wireless local area communications between the local
15 area server and a personal device, and

a personal device tailored to provide the personal internet based functions to a user of the personal device, wherein

the local area communications include user inputs from the personal device for directing internet communication functions of the local area server and data received from the internet
20 server to be provided to the personal device for use in providing the personal internet based functions to the user.

21. A computer system capable of operating with the internet, said computer system comprising:

a local area server operatively connected to said internet for transmitting digital information to and receiving other digital information from said internet;

25 a portable personal device capable of being hand-held by a user of said system, said device including means for wirelessly connecting to said local area server in a manner to transmit a representation of said digital information to said local area server and to receive a representation of said other digital information from said local area server; and

said local area server including means for converting said representation of said digital information into said digital information and for converting said other digital information into said representation of said other digital information;

5 whereby said user can communicate with said internet by using said hand-held, portable personal device within geographical limits imposed by transmission-constraints of said wirelessly connected means, while ambulatory, mobile or stationary.

22. A computer system capable of operating with the internet, said computer system comprising:

 a local area server connected to said internet for transmitting digital information to and receiving other digital information from said internet, and

10 a personal device including means for wirelessly transmitting a representation of said digital information to said local area server and for wirelessly receiving a representation of said other digital information from said local area server.

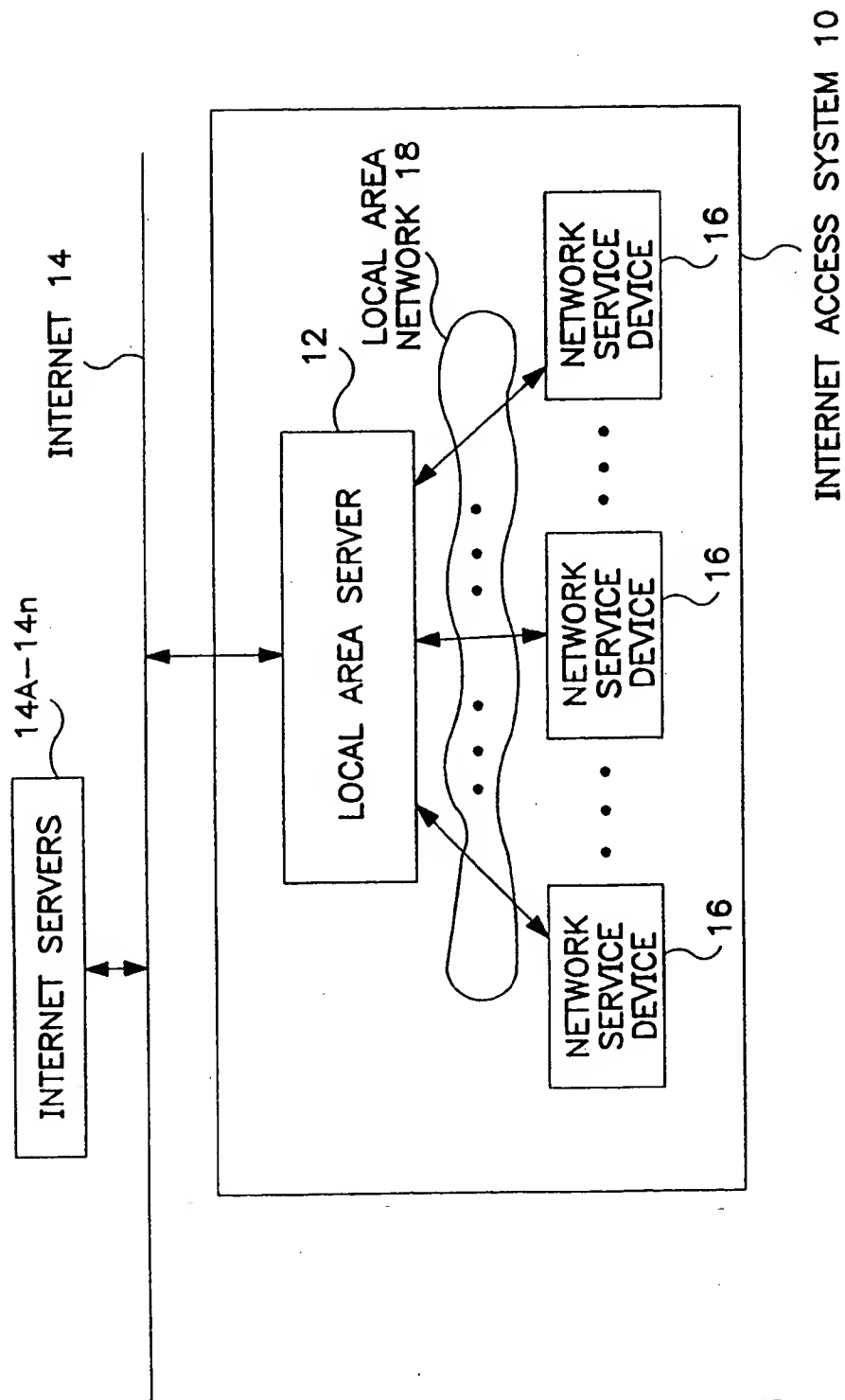


FIG. 1

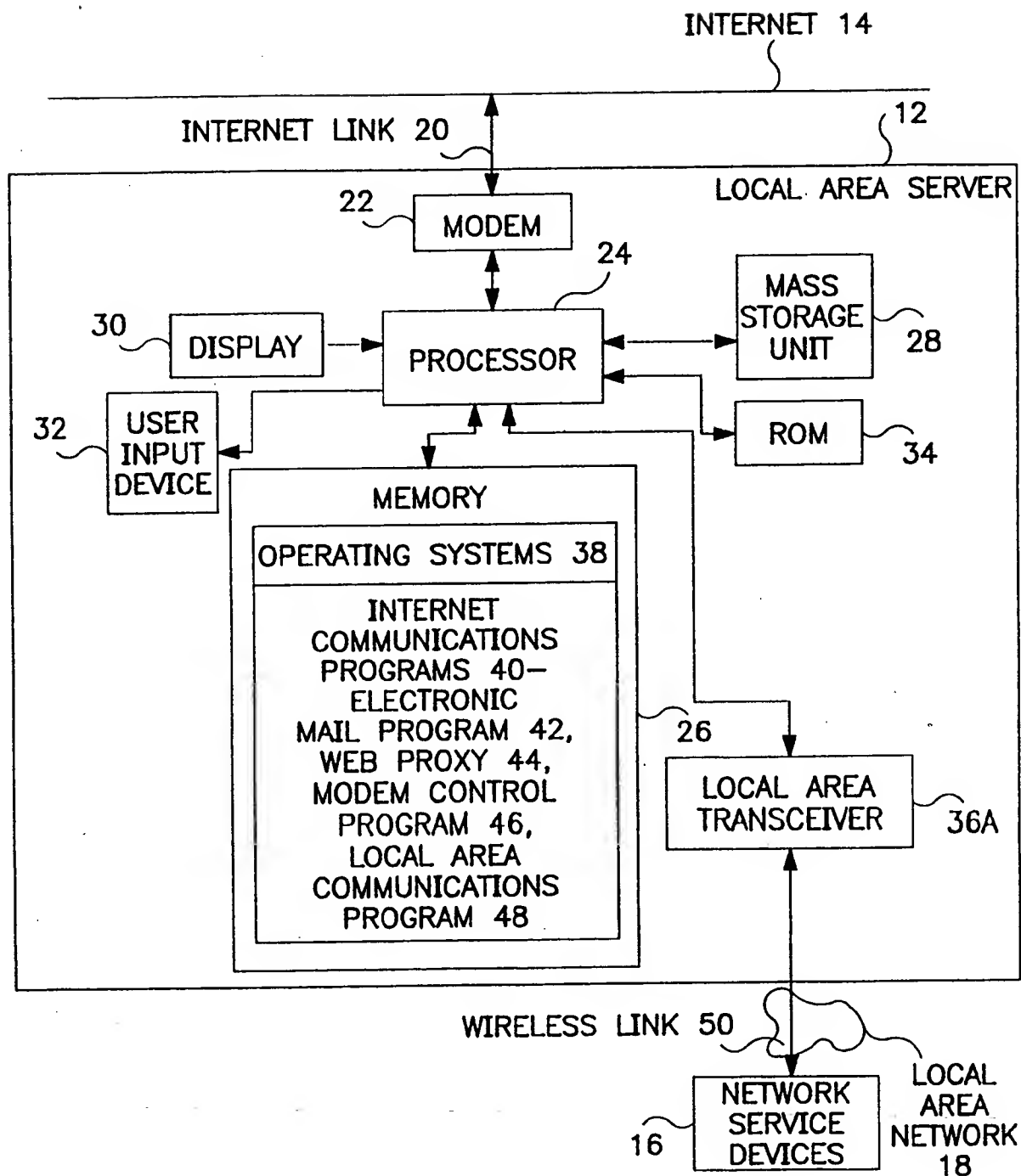
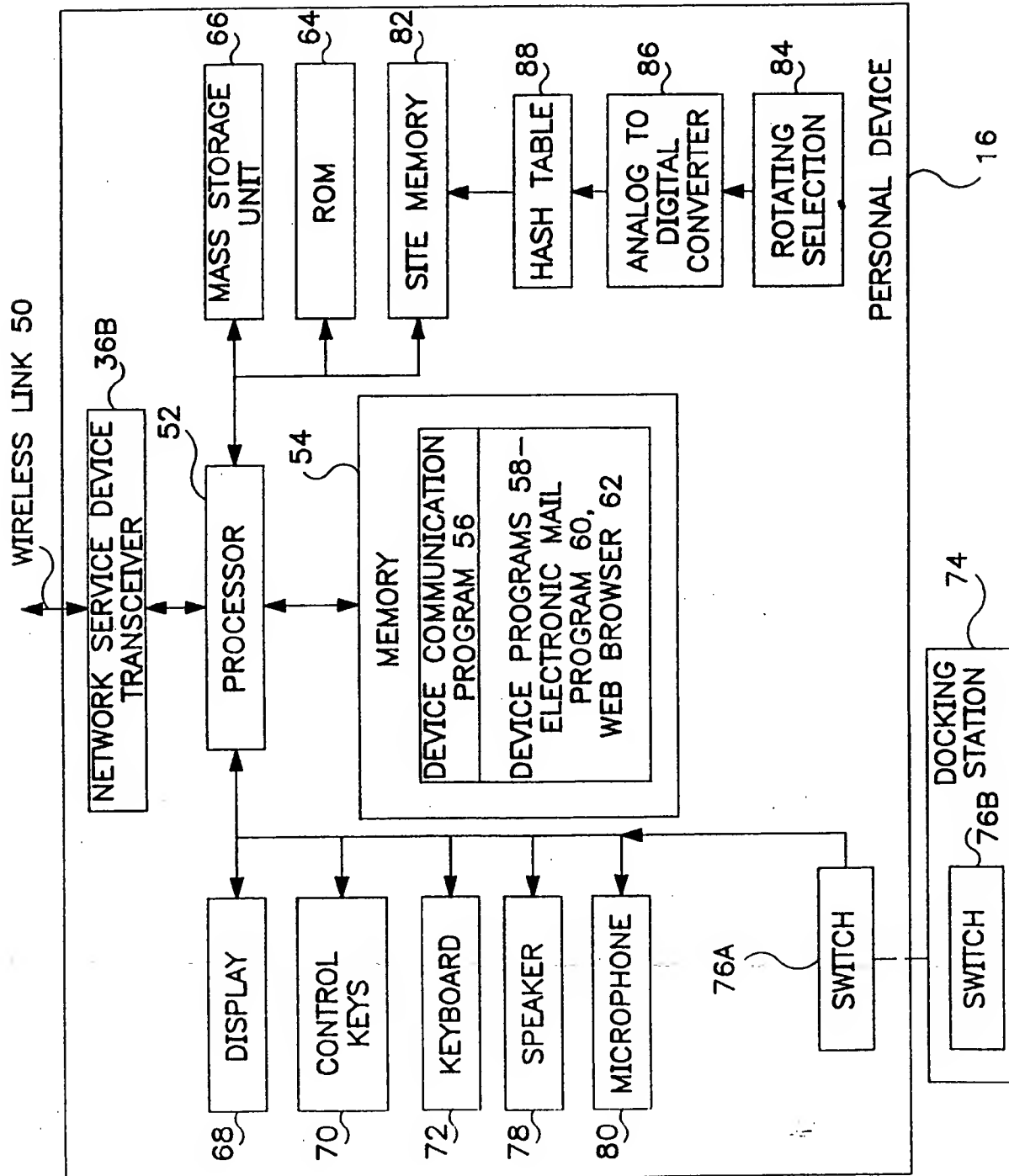


FIG. 2

FIG. 3



INTERNATIONAL SEARCH REPORT

International application No.
PCT/US99/04348

A. CLASSIFICATION OF SUBJECT MATTER

IPC(6) : H04Q 7/24

US CL : 709/203,370/338

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 709/203,370/338

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|-----------|---|-----------------------|
| Y,P | US 5,796,727 A (HARRISON et al) 18 AUGUST 1998 , col 3 line 8-31, col 11 line 14-35, col 12 line 15-18, 25-28, col 13 line 59,65, col 14 line 1,10,49,58. | 1-22 |
| Y | US 5,604,788 A (TETT) 18 FEBUARY 1997, col 1 line 40-55, col 2 line 10-14, 25-32, 45-51, col 3 line 7-9, col 5 line 42-col 6 line 3. | 1-22 |
| A,P | US 5,793,972 A (SHANE) 11 AUGUST 1998, see entire document. | 1-22 |
| A,P | US 5,715,443 A (YANAGIHARA et al) 03 FEBUARY 1998, see entire document. | 1-22 |
| A,P | US 5,732,216 A (LOGAN et al) 24 MARCH 1998, see entire document. | 1-22 |

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

| | |
|---|--|
| * Special categories of cited documents: | *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention |
| *A* document defining the general state of the art which is not considered to be of particular relevance | *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone |
| *B* earlier document published on or after the international filing date | *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art |
| *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) | *A* document member of the same patent family |
| *O* document referring to an oral disclosure, use, exhibition or other means | |
| *P* document published prior to the international filing date but later than the priority date claimed | |

Date of the actual completion of the international search

20 APRIL 1999

Date of mailing of the international search report

26 MAY 1999

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/US99/04348

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This international report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☒ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
☐ No protest accompanied the payment of additional search fees.